

MSME foundry unit invests Rs 83 lakhs on energy efficiency measures, saves Rs 73 lakhs every year on energy bill!

Background

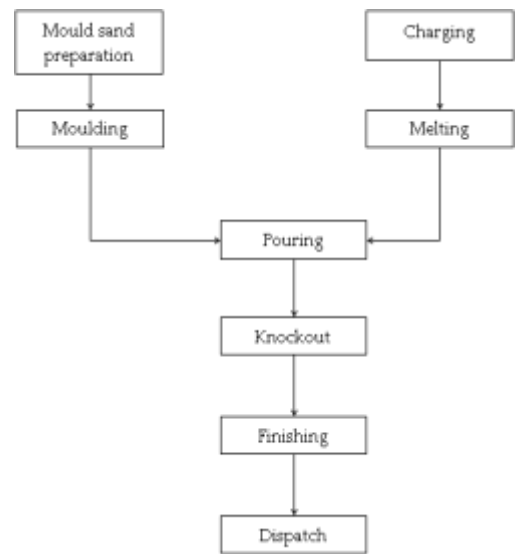
Kolhapur, in Maharashtra, is a foundry cluster. It has around 300 MSME foundries producing about 600,000 tonnes of castings annually, accounting for about 7–8% of India’s total castings production. The production capacity of these units varies from less than 1000 tonnes to over 10,000 tonnes per annum (tpa).

Unit profile

M/s K7 is an MSME unit manufacturing graded cast iron (CI) castings. The annual production is about 9750 tonnes. The total annual energy bill of the unit was about INR 698 lakhs. The total annual energy consumption was about 896 tonnes of oil equivalent (toe), in the form of grid electricity.

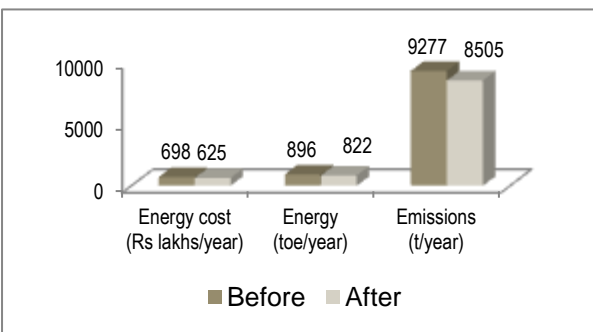
Process description

The major process steps are mould preparation, melting, pouring, knockout and finishing. Green sand is prepared using sand mixer and manually moulded. The charge is melted in an electrical induction furnace. The liquid metal is poured into moulds, which are left to cool and then ‘knocked out’ manually to yield the castings. The sand is reused, and the castings are subjected to shot blasting and machining to give the finished products.



The major energy consuming equipments used were three electrical induction furnace and electrical motors associated with process equipment such as reaction vessels, pumps, etc.

Overall Impact: post- implementation



Overall Impact
10% reduction in total energy bill (i.e. annual savings of INR 73 lakhs) with a simple payback of 1.1 years

This case study has been prepared under WB GEF Project titled “Financing Energy Efficiency at MSMEs in India”. The project aims to identify, design & implement Energy Efficiency (EE) solutions in 500 MSMEs in 5 clusters with potential of EE investment of more than Rs. 100 crore and reduction in GHG emissions equivalent to 1.2 million tonne CO₂. This project is being co-implemented by Small Industries Development Bank of India (SIDBI) and Bureau of Energy Efficiency

INTERVENTIONS

1. Replacement of one induction furnace with energy efficient IGBT induction furnace

Baseline Scenario

One of the unit's three induction furnaces, of 550 kW rated capacity (500 kg crucible capacity) had specific energy consumption (SEC) of 622 kWh/tonne of melting, which was high for furnaces of this category.

Recommendation

The unit was advised to replace this induction furnace with an energy efficient Insulated Gate Bipolar Transistor (IGBT) induction furnace of same rating and capacity.

Implemented Scenario

As advised, the unit replaced its existing 550 kW induction furnace with a 550 kW IGBT induction furnace of 500 kg crucible capacity.

This investment of INR 66.2 lakhs is saving 460,182 kWh annually, equivalent to INR 38 lakhs. The simple payback period is 1.7 years.

Other energy efficiency measures

No.	Energy efficiency measure	Investment (lakhs INR)	Annual savings (lakhs INR)	Simple payback period (years)
2	Installation of energy monitoring system	3.8	1.8	2.1
3	Lid mechanism for induction furnaces	8.4	17.6	0.5
4	Glass wool cover for ladle	0.8	3.3	0.2
5	Arresting compressed air leakage	–	4.3	–
6	Reducing generation pressure of compressed air	–	0.8	–
7,8	Replacement of two soft water pumps with EE pumps	1.7	3.6	0.5
9	Replacement of one raw water pump with EE pump	0.7	1.5	0.5
10	Replacement of aluminium blades of cooling tower fan by FRP blades	0.1	0.9	0.1
11	Removal of enclosure at air inlet in cooling tower 1	–	0.3	–
12	Replacing turbine motor of shot blast machine by EE motor	0.3	0.2	1.5
13	Energy efficient lighting	0.9	0.7	1.3
Totals		16.7	35.0	(av.) 0.5

Support provided under the project

- Walk-through & Detailed energy audit
- Identification of energy efficiency interventions in the unit
- Finalization of specifications for the energy efficiency interventions
- Identification of technology providers/vendors
- Facilitation for interactions between unit and technology providers;
- Technical support during commissioning
- Monitoring & Verification

Disclaimer: This case study has been compiled by TERI on behalf of SIDBI under WB-GEF Project. While every effort has been made to avoid any mistakes or omissions, these agencies will not be in any way liable for any inadvertent mistakes/omissions in the publication.

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